

REMARKS

Claims 1-35 are pending in this application. By this Amendment, claims 1-21 are amended and new claims 22-35 are added. Further, the specification and the drawings are corrected. Reconsideration is respectfully requested.

✓ **I. Amendment to the Specification**

Passages of the specification have been amended to obviate typographical errors and for clarification purposes. Entry of the amendment to the specification is respectfully requested.

✓ **II. Drawing Corrections**

Figs. 3, 4, 10 and 22-24 have been corrected by inserting a bracket indicating that separate views of each of those figures belong to the same figure. Entry of the figures is respectfully requested.

III. Objection to the Claims

The Office Action objects to claims 2-21 based on formal matters. Claims 2-21 have been amended to obviate the objection. Accordingly, withdrawal to the objection to the claims is respectfully requested.

IV. Rejection Under 35 U.S.C. 112, Second Paragraph

The Office Action rejects claims 1-21 under 35 U.S.C. §112, second paragraph as being indefinite.

In claim 1, the Office Action considers the term "an object" as not being part of the claimed structure, and thus does not further limit the claimed apparatus. The rejection is respectfully traversed.

For example, in paragraph [0178] of the application, it is disclosed that the thermal-expansion detecting mark 54, main body 56, projecting member 58, and service-light-emitting sheet 60 cooperate to constitute an example of an object (disposed on the movable portion) to

be imaged by the first image-taking device 52 (disposed on the main body structure), while the thermal-expansion detecting mark 92, main body 94, projecting member 96 and surface-light-emitting sheet 98 cooperate to constitute an example of an object (disposed on the main body structure) to be imaged by the second image-taking device 74 (disposed on the movable portion).

Claim 1 recites that an image of the object taken by recited image-taking device is used by the recited controller to determine a drive signal to be applied to the recited drive device to provide a linear motion of the recited movable portion through the recited motion-transmitting member. Therefore, the object is structural in feature and permits the electric component to be mounted on the substrate with a high degree of positioning accuracy, irrespective of the thermal expansion of the mounting system, due to the positional relationship between the object and the image-taking device such that the relative positioning error of the object and the image-taking device which is detected on the basis of the image of the object represents a thermal-expansion positioning error of the object.

In claims 2 and 7, the Office Action asserts that "at a position at which said image-taking device is not substantially influenced by the thermal" is unclear. The term "position" has been replaced by "portion" to clarify the language of the claim.

The Office Action further asserts that the term "thermal expansion" has very little effect on the claim mounting system. On the contrary, the thermal expansion has an adverse effect on the functionary of the mounting system, which is also recognized by the JP5-241660 (JP '660) reference. Thermal expansion has to be suitably dealt with to assure accurate positioning of the electric component as mounted on the substrate. The claimed invention is directed to an improved structural arrangement of the mounting system capable of minimizing the adverse influence of the thermal expansion of the system (main body structure and movable portion) on the accuracy of positioning of the electric component as mounted on the

substrate, while maintaining a high degree of component mounting deficiency, that is, without a long warm-up operation of the system, or without operation to take an image of the component holder (nozzle 3 in JP '660) without the electric component being held by the component holder or without an operation to take an image of an element (e.g., jig 13 used in JP '660) held by the component holder. Accordingly, withdrawal of the rejection under 35 U.S.C. §112, second paragraph is respectfully requested.

V. The Claims Define Patentable Subject Matter

The Office Action rejects claims 1-21 under 35 U.S.C. §103(a) over applicant admitted prior art (APA) in view of JP '660. The rejection is respectfully traversed.

In particular, neither APA nor JP '660 disclose or suggest the object is fixedly disposed on the movable portion and is spaced apart from the component holder in a direction parallel to the substrate as supported by the substrate supporting device, as in claim 1.

The Office Action asserts that the component or component holder which is referred to in the APA can be regarded as the "object" recited in claim 1 (see page 4, lines 7 and 8 and page 5, lines 4-6 of the Office Action). The Office Action refers to paragraph [0020] of JP '660 as disclosing the above noted feature of claim 1. The assertions are respectfully traversed. Paragraph [0020] of JP '660 discloses an image of a suction nozzle 3 or jig 13 which is taken by image-taking device 8 to compensate the component mounting position for a positioning error which includes an error due to the thermal expansion of screwball 10.

However, claim 1 recites the object is fixedly disposed on the moveable portion and is spaced apart from the component holder in a direction parallel to the substrate as supported by the substrate supporting device. Accordingly, claim 1 excludes the component holder of APA, the electric component held by this component holder, and the jig 13 of JP '660 held by the component holder 3. Specifically, the object is spaced apart from the component holder

means that the object is not the component holder, the electric component nor the jig 13 held by the component holder.

✓ (With respect to independent claim 23, neither APA nor JP '660 disclose or suggest the object disposed on the main body and the image-taking device disposed on the movable portion.

APA shows an image-taking device arranged to take an image of the fiducial mark fixed on a substrate (see paragraph [0006]). JP '660 discloses image-taking device 9 arranged to take an image of a mark 8 fixed substrate 6, the image of the fiducial mark or the mark 8. This does not accurately represent the position of the main body structure since the substrate is held by a substrate supporting a holder device which has a positioning error with respect to the main body structure. Claim 23 recites that the object and the image-taking device are disposed relative to each other such that an error of relative positioning of the object and the image-taking device, which is detected on the basis of the image of the object, substantially represents a thermal-expansion positioning error of the object which is derived from the thermal expansion of the system. Because neither APA nor JP '660 disclose or suggest the image of the mark fixed on the substrate, they do not represent the thermal expansion position error of main body structure.


Therefore, independent claims 1 and 23 define patentable subject matter. Claims 2-22 and 24-35 depend from the respective independent claims, and therefore also define patentable subject matter. Accordingly, withdrawal of the rejections under 35 U.S.C. §103(a) is respectfully requested.

VI. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-35 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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